

REMARKS**I. INTRODUCTION**

In response to the Office Action dated September 26, 2003, claims 1, 2, 36, 37, 71, 72, 106, 108 and 110 have been amended. Claims 1, 2, 4, 6-21, 35-37, 39, 41-56, 70-72, 74, 76-91 and 105-111 remain in the application. Entry of these amendments, and re-consideration of the application, as amended, is requested.

II. CLAIM AMENDMENTS

Applicants' attorney has made amendments to the claims as indicated above. These amendments were made solely for the purpose of clarifying the language of the claims, and were not required for patentability or to distinguish the claims over the prior art.

III. NON ART REJECTION

On page (2) of the Office Action, claims 1, 2, 4, 6-21, 35-37, 39, 41-56, 70-72, 74, 76-91 and 105-111 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Office Action asserts that it is unclear/vague 1) what comprises the SGDBR laser claimed; 2) the configuration of the front and back mirrors and 3) the relationship of the gain section to the remaining sections of the laser and if the claimed invention includes an active region separate from the gain section.

Regarding claims 4 and 6-21, the Office Action asserts that it is unclear/vague how the DSP is interrelated and functions with the other elements of the claim and 1) dithers the front and back mirror, 2) uses a least mean squares estimator, 3) uses a block LMS algorithm etc. In response, Applicants have previously amended independent claim 1 to recite that the controller comprises a digital signal processor (DSP) using a numerical minima search to control the front mirror current and the back mirror current to minimize the voltage monitored from the gain section of the laser.

Regarding claims 106-111, the Office Action asserts that in addition to the discussion above, it is unclear/vague where the claimed SOA is located within the SGDBR and how it is interrelated within the SGDBR structure.

Applicants have previously noted that an SGDBR laser is not claimed, rather the claimed invention is directed to a controller, method and article for controlling a SGDBR laser. Accordingly,

Applicants have asserted that the claims can not be found indefinite for failing to particularly point out and distinctly claim subject matter which Applicants do not regard as the invention. Applicants have further noted that the configuration and relationship of various sections of SGDBR lasers are known in the art. See e.g., page 4, lines 14-21 and page 7, line 16 to page 8, line 28 of the application as filed. A recitation of the specific configuration of a known device that merely bears a relationship to the claimed subject matter (i.e. an SGDBR laser controlled by the claimed subject matter) is not a requirement for definiteness.

In response to Applicants previous arguments, the final Office Action notes that 35 U.S.C. §112 requires the Applicant establish the metes and bounds of the claimed invention to one of ordinary skill in the art. The Office Action then asserts that "the standard is for one of ordinary skill in the art; not necessarily what the Applicant regards as the invention if the invention is claimed in a way that makes the claimed invention indefinite". The final Office Action further adds that "variations of a SGDBR laser are known in the art" and that "Applicant has claimed a controller/method for controlling an SGDBR in the preamble of the claims without reciting the necessary structure and structural relationships to establish the SGDBR laser being controlled".

In response, Applicants have amended the claims as indicated above in order to overcome the rejections and further clarify the claim language. Applicants respectfully request withdrawal of the present §112 rejections.

However, in order to expedite future prosecution of the application, Applicants also note here the appropriate standard of review for the requirements of 35 U.S.C. §112, second paragraph.

The Office Action is correct to identify that the standard of review for §112, second paragraph is from that of one of ordinary skill in the art. However, the claims need only define the subject matter with a reasonable degree of particularity and distinctness. Furthermore, the analysis is performed, not in isolation, but while considering the content of the particular application disclosure, the teachings of the prior art and the claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made. See, e.g. MPEP §2173.02, a portion of which is reproduced below.

The examiner's focus during examination of claims for compliance with the requirement for definiteness of 35 U.S.C. 112, second paragraph is whether the claim meets the threshold requirements of clarity and precision, not whether more suitable language or modes of expression are available. When the examiner is satisfied that patentable subject matter is disclosed, and it is apparent to the examiner that the

claims are directed to such patentable subject matter, he or she should allow claims which define the patentable subject matter with a reasonable degree of particularity and distinctness. Some latitude in the manner of expression and the aptness of terms should be permitted even though the claim language is not as precise as the examiner might desire. Examiners are encouraged to suggest claim language to applicants to improve the clarity or precision of the language used, but should not reject claims or insist on their own preferences if other modes of expression selected by applicants satisfy the statutory requirement.

The essential inquiry pertaining to this requirement is whether the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity. Definiteness of claim language must be analyzed, not in a vacuum, but in light of:

- (A) The content of the particular application disclosure;
- (B) The teachings of the prior art; and
- (C) The claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made. MPEP §2173.02

In this context, the courts repeatedly note that the standard for review is from the viewpoint of one of ordinary skill in the art. In particular, courts note that a rejection of the claim under 35 U.S.C. 112, second paragraph is appropriate only if the language of a claim is such that a person of ordinary skill in the art could not interpret the metes and bounds of the claim so as to understand how to avoid infringement. See, e.g. Morton Int'l, Inc. v. Cardinal Chem. Co., 5 F.3d 1464, 1470, 28 USPQ2d 1190, 1195 (Fed. Cir. 1993) and MPEP §2173.02. Applicants respectfully submit that in view of the disclosure content and the teachings of prior art the instant claims satisfy the legal requirements for clarity and precision.

With respect to the claims being directed to a controller and not the SGDBR laser controlled, Applicants submit that the claims need only recite those elements and aspects of an SGDBR laser necessary to define the claimed controller to one of ordinary skill in the art. Requiring a complete recitation of each and every element of a known SGDBR laser that is not the claimed subject matter exceeds the requirements of §112, second paragraph. The Office Action asserts that Applicants have not recited the "necessary structure and structural relationships to establish the SGDBR laser being controlled". However, Applicants submit that claims do recite (and need only recite) the necessary structure and structural relationships to establish the controller and how it operates to control a known SGDBR laser as reviewed by one of ordinary skill in the art.

The Office Action also notes that variations of a SGDBR laser are known in the art, presumably to bolster the basis for the §112 rejection. However, such recognition is not a reason to require the claims to be limited to a particular SGDBR laser to be controlled. Such a standard of

review for §112, second paragraph would unfairly narrow the claim coverage when it is not otherwise indicated by the prior art. On the contrary, Applicants submit that in order to satisfy §112, second paragraph it is sufficient that the controlled SGDBR be included in the claims only in so far as it is necessary for one of ordinary skill in the art to reasonably understand the definition of the claimed controller.

As the claims as currently amended define the patentable subject matter with a reasonable degree of particularity and distinctness to one of ordinary skill in the art, they therefore meet the requirements §112, second paragraph as illustrated in MPEP §706 and §2173.02. In view of the above, Applicants respectfully request withdrawal of the present §112 rejections.

IV. PRIOR ART REJECTIONS

On page (3) of the Office Action, claims 1, 2, 4, 6-21, 35-37, 39, 41-56, 70-72, 74, 76-91 and 105-111 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sarlet et al., Wavelength and Mode Stabilization of Widely Tunable SG-DBR and SSG-DBR Lasers (Sarlet) in view of JP1108572A (Hitachi). The Office Action asserts that it would have been obvious to one of ordinary skill in the art to modify Sarlet "to include the DSP and minima search to stably obtain and control the voltage values of the gain section of the laser claimed".

Independent claims 1, 36, and 71 are generally directed to an apparatus, method and article of manufacture for controlling a sampled grating distributed Bragg reflector (SGDBR) laser. For example, claim 1 recites a controller for providing separate current inputs to the SGDBR laser including a front mirror current controlling a front sampled grating mirror and a back mirror current controlling a back sampled grating mirror to control the SGDBR laser and a voltage monitor, coupled to a gain section of the SGDBR laser for monitoring a gain voltage of the gain section and providing input of the gain voltage to the controller. The controller comprises a digital signal processor (DSP) using a numerical minima search to control the front mirror current and the back mirror current to minimize the gain voltage monitored from the gain section of the SGDBR laser and the SGDBR laser comprises the front sampled grating mirror and the back sampled grating mirror bounding a cavity, the cavity including the gain section.

The cited references, Sarlet and Hitachi, do not teach or suggest these various elements of Applicants' independent claims.

Sarlet merely describes a mode stabilization scheme for widely tunable SG-DBR and SSG-DBR lasers, showing that a minimum in active section voltage is obtained when a cavity mode and reflection peak of each DBR mirror are aligned. Sarlet notes that locking the laser to such a local minimum in active section voltage therefore ensures stable single-mode operation. However, nowhere does Sarlet teach or suggest a DSP using a numerical minima search to control the front mirror current and the back mirror current to minimize the gain voltage monitored from the gain section of the SGDBR laser as claimed.

Hitachi teaches a numerical function minimum point search procedure that involves determining a small point of a numerical function repetitively from an initial value using a recurrence formula involving a predetermined variable and absolute value of a Hessian symmetrical matrix. However, like Sarlet, nowhere does Hitachi teach or suggest a DSP using a numerical minima search to control the front mirror current and the back mirror current to minimize the gain voltage monitored from the gain section of the SGDBR laser as claimed.

Regarding Applicants prior arguments, the Office Action asserts that it is inherent of Sarlet that an analog circuit will be used to condition/monitor the gain voltage. The Office Action further asserts that the voltages are read out by a PC before updating the drivers and that the use of a PC requires, inherently, a conversion to digital format. The Office Action then asserts such teaching reads on Applicants' claims without more definite claim language.

However, nothing in Sarlet suggests employing a DSP using a numerical minima search as presently claimed. Furthermore, Sarlet teaches away from employing a DSP for such a process because Sarlet describes instead a wavelength stabilization circuit using two lock-in amplifiers which measure modulation components (induced from small sinusoidal signals added to the front and rear DBR currents) from an active section voltage. The drive currents for the front and rear DBR sections are updated using a simple proportional controller. See page 1352, col. 2, lines 1-9 and FIG. 2. Applicants submit that mere teaching of the results being read out to a PC does not suggest employing a DSP using a numerical minima search as presently claimed. Moreover, Sarlet teaches away from the claimed DSP using a numerical minima search by explicit teaching of employing a simple proportional controller.

In addition to lacking any teaching or suggestion of a DSP using a numerical minima search Hitachi's numerical analytical method is devoid of any suggestion of any application to a laser controller or any other sort of controller. In fact, Hitachi's teaching is entirely generic with no

suggestion even for its use in a DSP. As such, the suggestion to combine Hitachi's teaching to that of Sarlet can only be made with impermissible hindsight, particularly because Sarlet's teaching of an SSG-DBR controller teaches away from use of a DSP using a numerical minima search as discussed above.

Accordingly, Applicants submit that the present independent claims 1, 36 and 71 are allowable over Sarlet and Hitachi because each and every element of the claims is not taught by the combined references.

Moreover, the various elements of Applicants' claimed invention together provide operational advantages over Sarlet and Hitachi. For example, as indicated by Sarlet, the small sinusoidal signals added to the front and rear reflector currents will result in frequency and power modulation. See page, 1353, col. 1, line 11 to col. 2, line 9. By employing a DSP using numerical minima search in the present invention, these modulations are avoided.

Thus, Applicants submit that independent claims 1, 36 and 71 are allowable over Sarlet and Hitachi. Further, dependent claims 2, 4, 6-21, 35, 37, 39, 41-56, 70, 72, 74, 76-91 and 105-111 are submitted to be allowable over Sarlet and Hitachi in the same manner, because they are dependent on independent claims 1, 36 and 71, respectively, and thus contain all the limitations of the independent claims. In addition, dependent claims 2, 4, 6-21, 35, 37, 39, 41-56, 70, 72, 74, 76-91 and 105-111 recite additional novel elements not shown by Sarlet and Hitachi.

V. CONCLUSION

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited. Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicants' undersigned attorney.

Respectfully submitted,

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